United States Department
of Agriculture

Natural Resources
Conservation Service

Lakewood, Colorado

RWA 13010003

December 2007

San Luis Watershed

Hydrologic Unit Code 13010003

Rapid Assessment

Satellite Imagery: ArcIMS Server - Geographic Network Services hosted by ESRI

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Introduction

Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

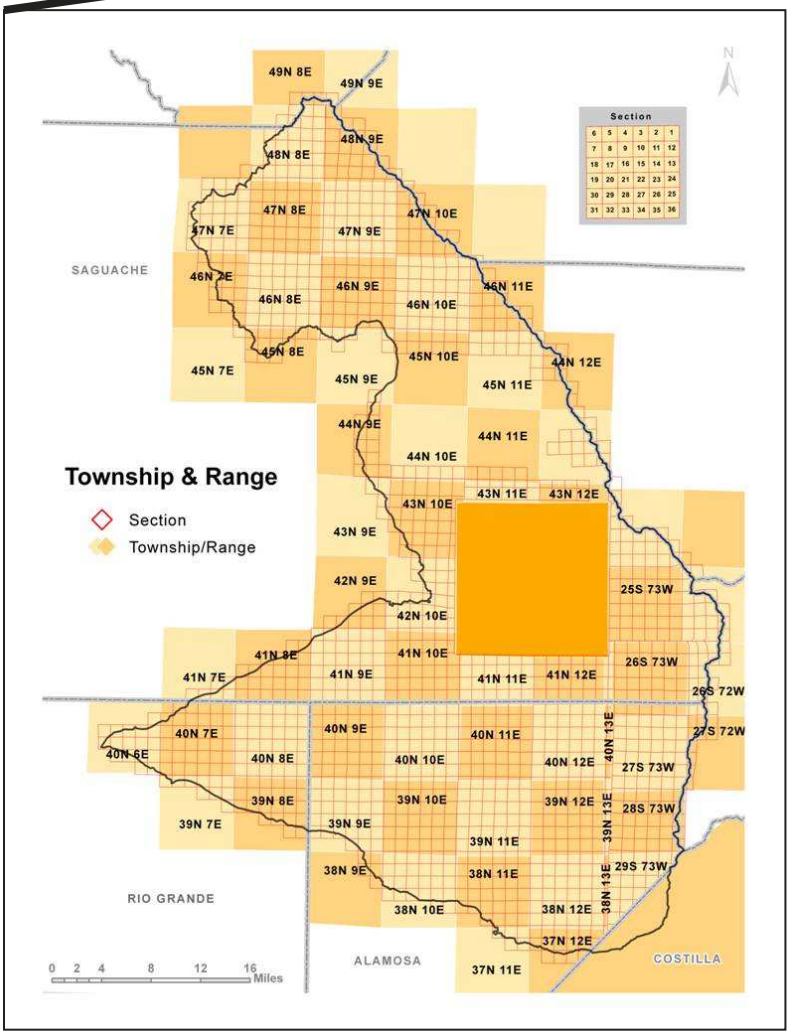
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals.

Benefits of these Activities

While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

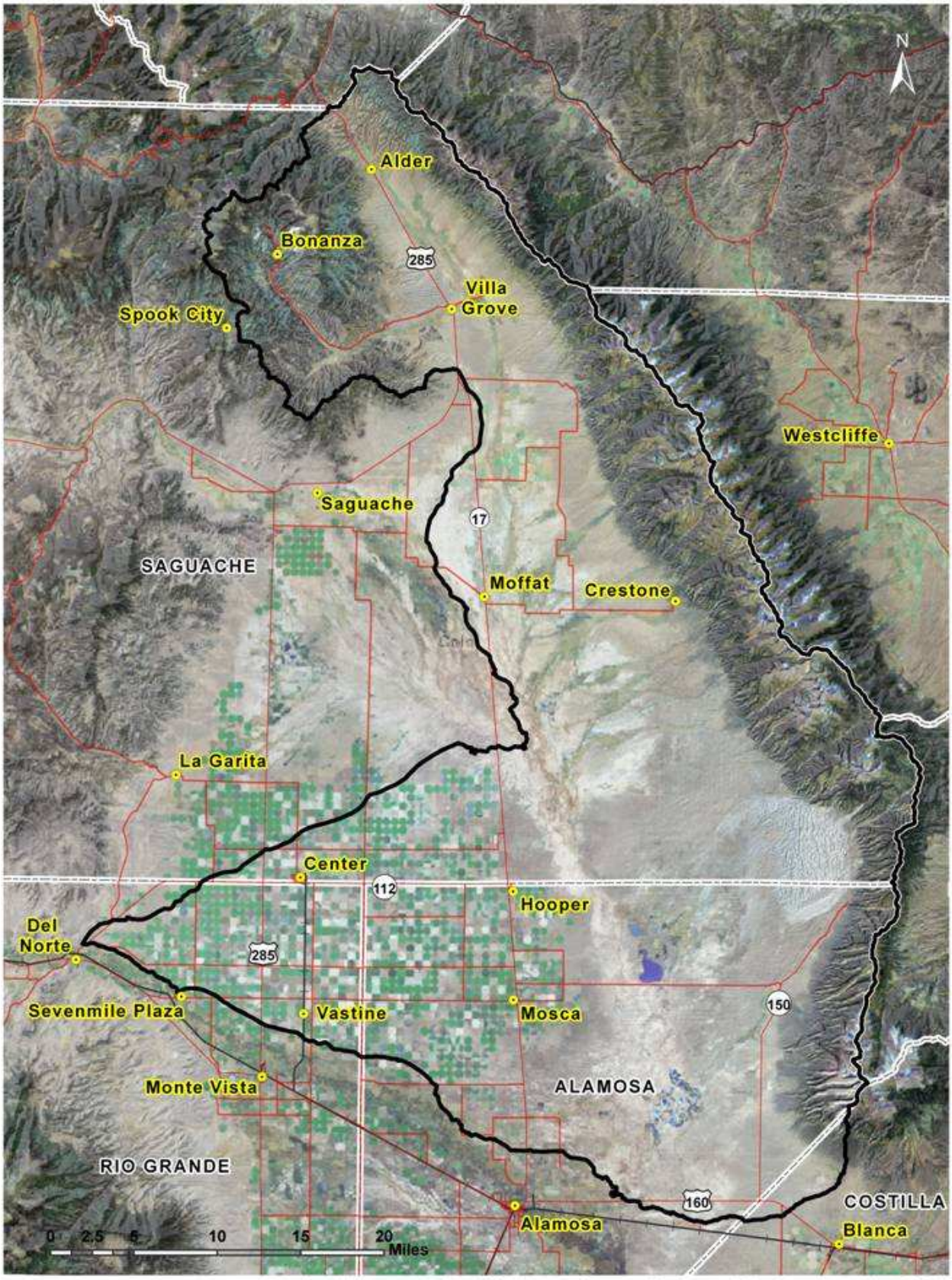
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

Rapid Watershed Assessments provide information that helps landowners and local leaders set conservation priorities.



County	County Acres	County Acres in SAN LUIS Watershed	% of County in the Watershed	% of Watershed in the County
Alamosa	462,644	316,246	68.4%	31.2%
Costilla	787,109	9,483	1.2%	0.9%
Rio Grande	584,463	68,246	11.7%	6.7%
Saguache	2,027,649	617,857	30.5%	61.0%
		1,012,052		

San Luis Watershed - 13010003



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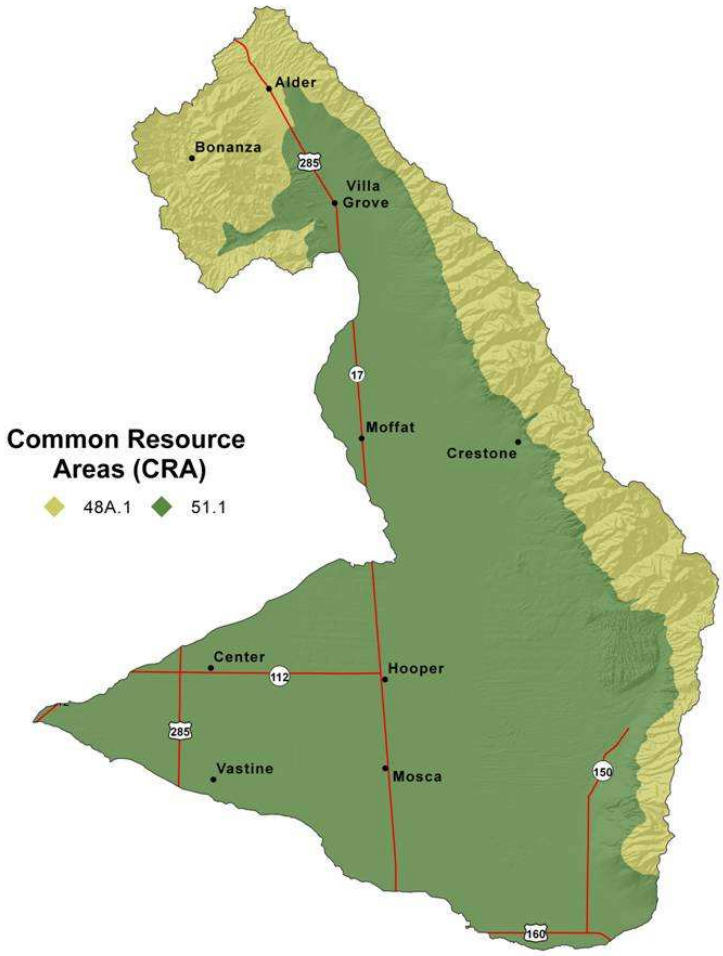
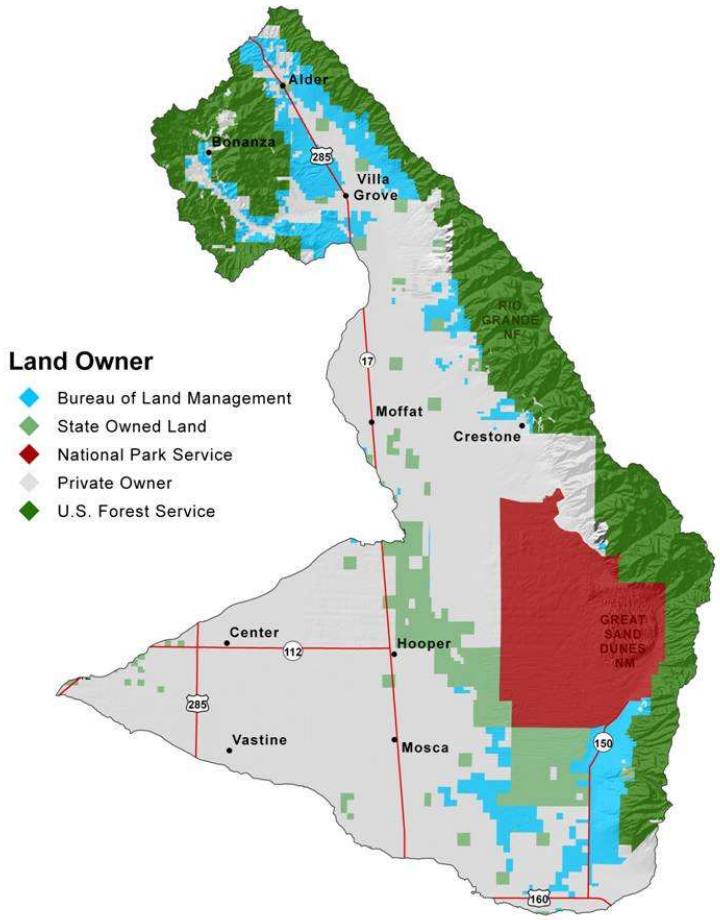
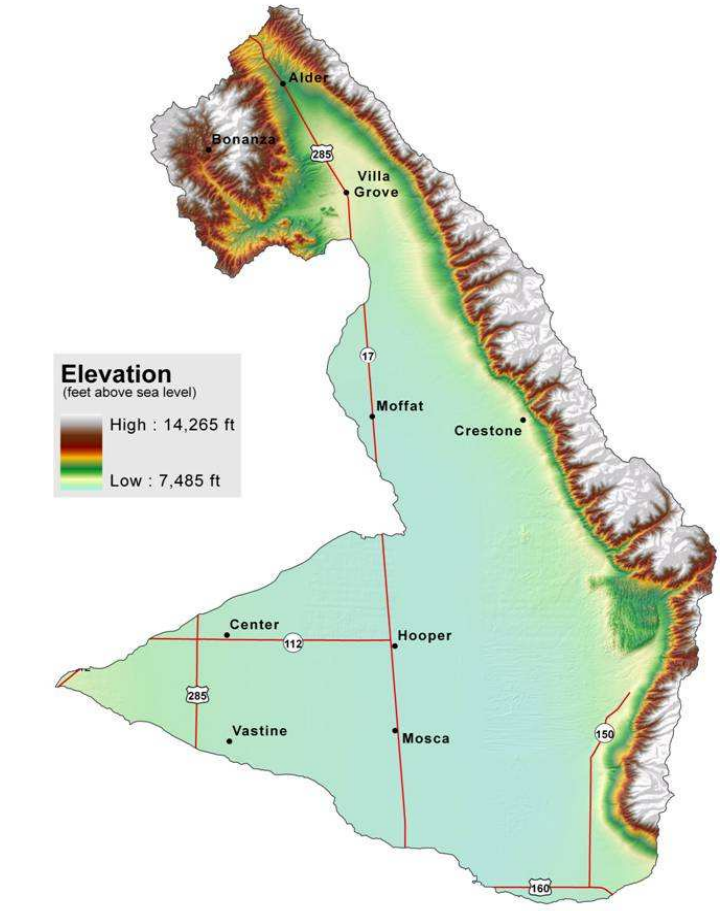


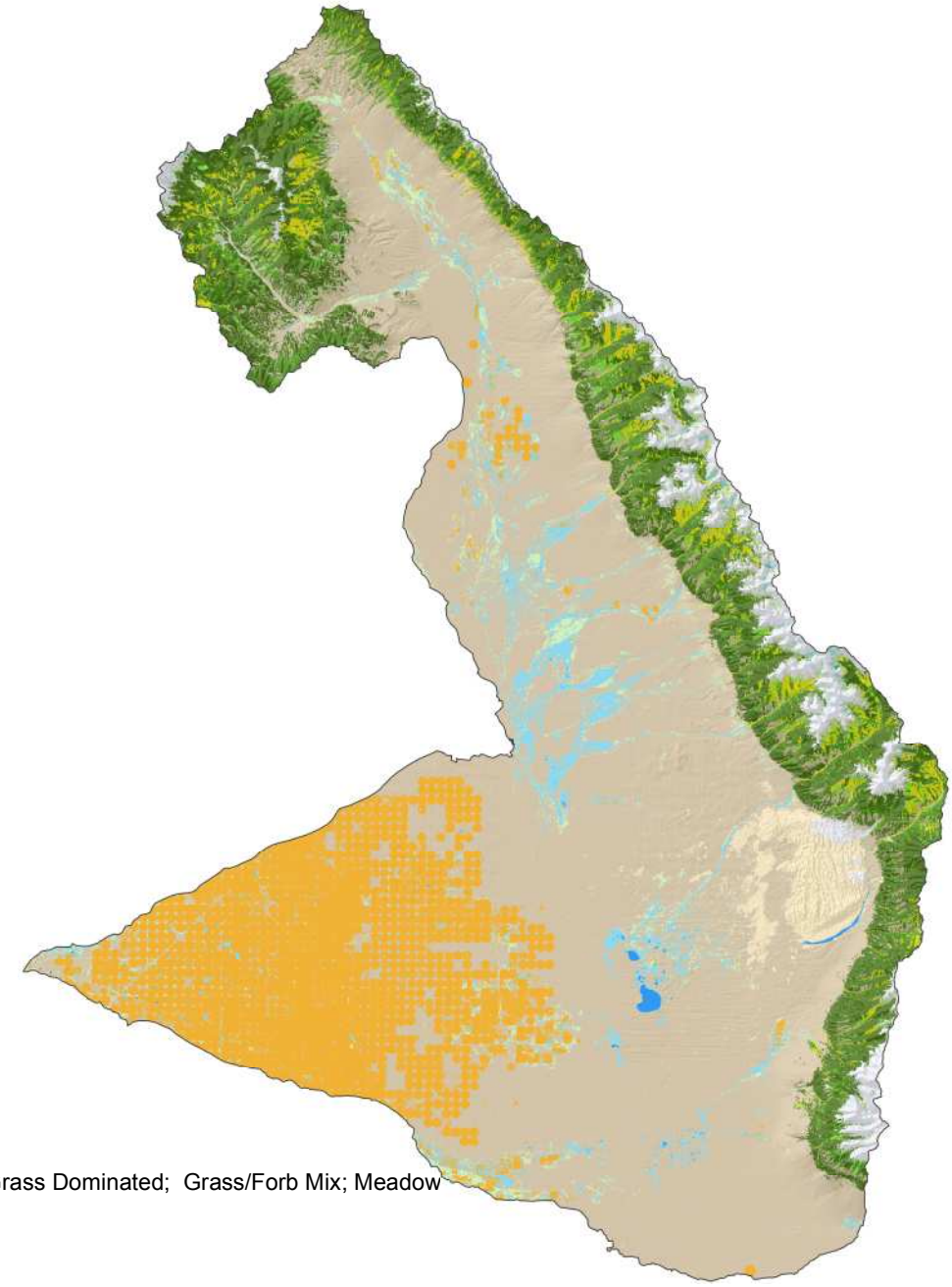
Common Resource Areas (CRA): Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

MLRA	CRA	CRA NAME	DESCRIPTION
48A	**48A.1**	Southern Rocky Mountains - High Mountains and Valleys	This area is best characterized by steep, high mountain ranges and associated mountain valleys. The temperature regimes are mostly frigid and cryic; moisture regimes are mainly ustic and udic. Vegetation is sagebrush-grass at low elevations, and with increasing elevation ranges from coniferous forest to alpine tundra. Elevations range from 6,500 to 14,400 feet
51	**51.1**	High Intermountain Valleys	This is an area of low relief composed of valley fill sediments from the surrounding mountains. The temperature regime is mainly frigid but includes mesic in the southern part. The moisture regime is aridic. Characteristic native vegetation is greasewood, fourwing saltbush, and alkali sacaton.

San Luis Land Ownership	
Bureau of Land Management	99,691
National Park Service	36,522
Private	585,136
State	73,904
State, County, City; Wildlife, Parks & Rec	3,274
U.S. Forest Service	213,525



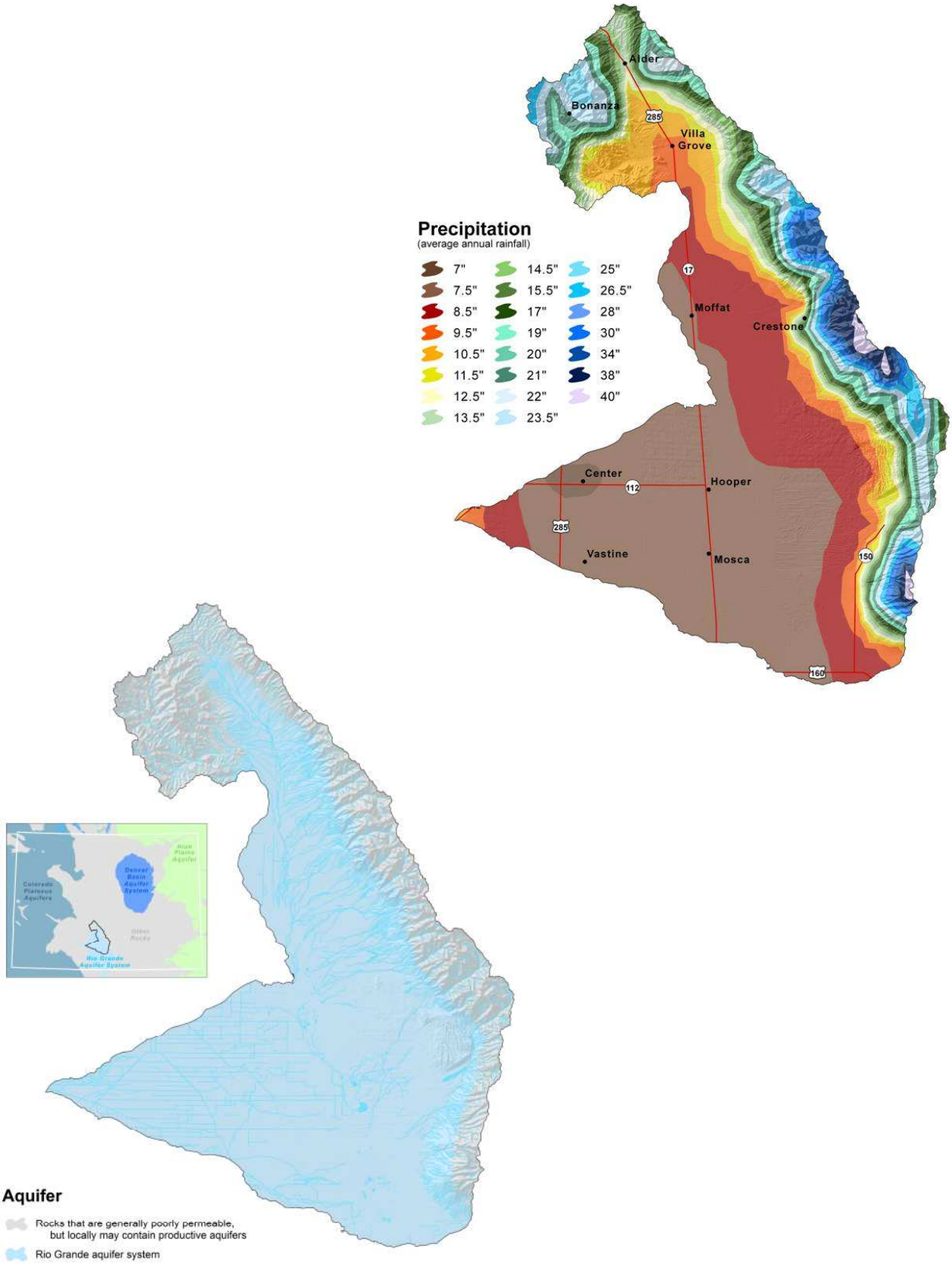




Vegetation

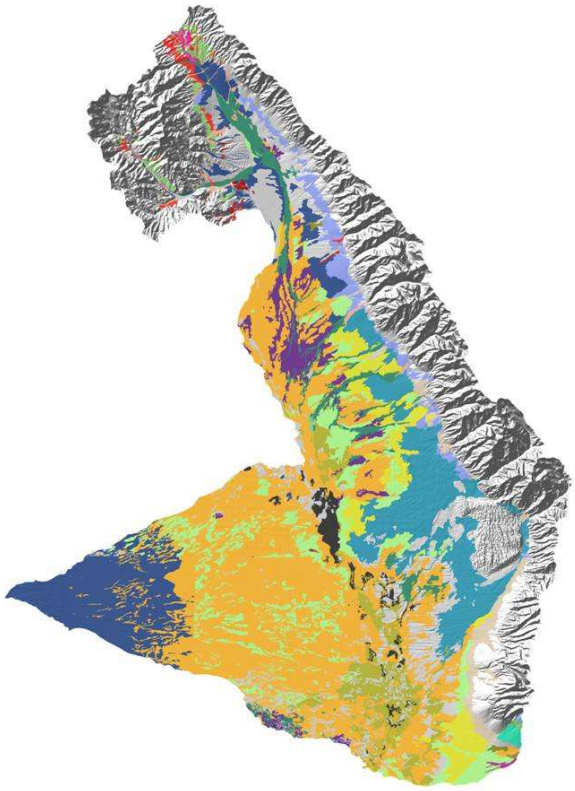
- Agriculture Land
- Alpine Forb Dominated; Grass Dominated; Grass/Forb Mix; Meadow
- Aspen
- Mixed Forest
- Rangeland
- Evergreen Forest
- Commercial; Residential; Urban/Built Up
- Riparian
- Grass Dominated
- Irrigated Ag
- Rock; Snow; Talus Slopes & Rock Outcrops
- Sand Dune Complex
- Subalpine Grass/Forb Mix; Meadow; Shrub Community
- Water

SAN LUIS Land Use	Total Acreage	Vegetation	Acreage
Cropland	157,431	Irrigated Ag	157,431
Rangeland/Grassland	599,621	Alpine Grass Dominated	5,140
		Alpine Grass/Forb Mix	6,846
		Gambel Oak	6,542
		Grass Dominated	25,472
		Grass/Forb Mix	4,320
		Greasewood	152,700
		PJ-Mtn Shrub Mix	4,379
		Pinon-Juniper	19,089
		Rabbitbrush/Grass Mix	245,686
		Sagebrush Community	7,848
		Sagebrush/Gambel Oak Mix	6,497
		Sagebrush/Mesic Mtn Shrub Mix	1,599
		Sand Dune Complex	22,521
		Sedge	20,493
		Shrub/Brush Rangeland	12
		Shrub/Grass/Forb Mix	53,182
		Sparse Grass (Blowouts)	1
		Sparse PJ/Shrub/Rock Mix	5,375
		SubAlpine Shrub Community	4,558
		Subalpine Grass/Forb Mix	1,739
		Upland Willow/Shrub Mix	71
		Xeric Mountain Shrub Mix	5,551
Forest	184,201	Aspen	23,658
		Aspen/Mesic Mountain Shrub Mix	60
		Bristlecone Pine	1,178
		Cottonwood	3,815
		Douglas Fir	9,700
		Douglas Fir/Aspen Mix	17,451
		Douglas Fir/Englemann Spruce Mix	4,637
		Englemann Spruce/Fir Mix	68,529
		Limber Pine	173
		Lodgepole Pine	1,638
		Lodgepole/Spruce/Fir Mix	2,381
		P. Pine/Gambel Oak Mix	6
		Ponderosa Pine	11,179
		Ponderosa Pine/Aspen Mix	146
		Ponderosa Pine/Douglas Fir Mix	19,111
		Spruce/Fir/Aspen Mix	19,440
		Spruce/Fir/Lodgepole/Aspen Mix	37
		Spruce/Lodgepole Pine Mix	13
		Willow	1,049
Riparian	28,170	Conifer Riparian	336
		Herbaceous Riparian	26,519
		Shrub Riparian	1,315
Water	1,942	Water	1,942
Other	40,687	Soil	2,900
		Rock	37,410
		Talus Slopes & Rock Outcrops	233
		No Data	145
Total Watershed Acres			**1,012,051**


Alder
Bonanza
285
Villa Grove
Precipitation
(average annual rainfall)
7"
7.5"
8.5"
9.5"
10.5"
11.5"
12.5"
13.5"
14.5"
15.5"
17"
19"
20"
21"
22"
23.5"
25"
26.5"
28"
30"
34"
38"
40"
17
Moffat
Crestone
Center
112
Hooper
285
Vastine
Mosca
150
160
Aquifer
Rocks that are generally poorly permeable, but locally may contain productive aquifers
Rio Grande aquifer system

Soil: Ecological Site Names

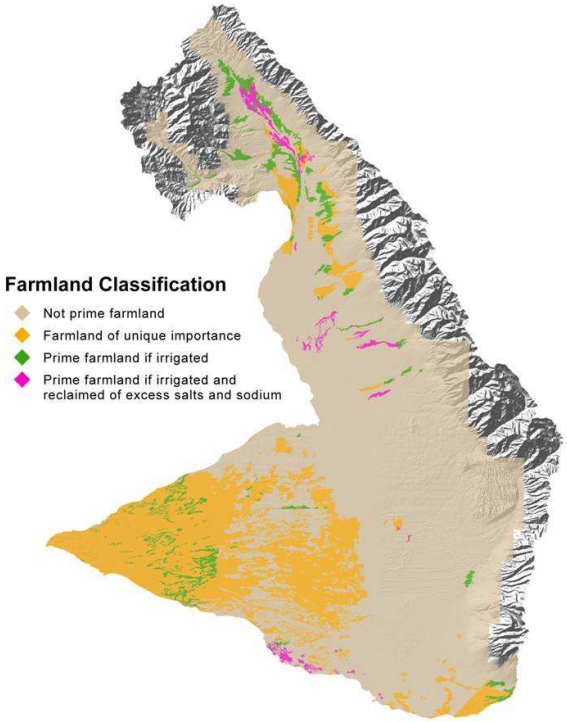
- Alkali Overflow
- Basalt Hill
- Deep Sands
- Foothill Loam
- Foothill Sand
- Limy Bench
- Loamy Foothills
- Mountain Loam
- Mountain Loam 10-14
- Mountain Outwash
- Rocky Foothills
- Salt Flats
- Salt Meadow
- Sand Hummocks
- Sandy Bench
- Shallow Loam
- Subalpine Loam
- Valley Bench
- Valley Sand
- Wet Meadow
- No Data

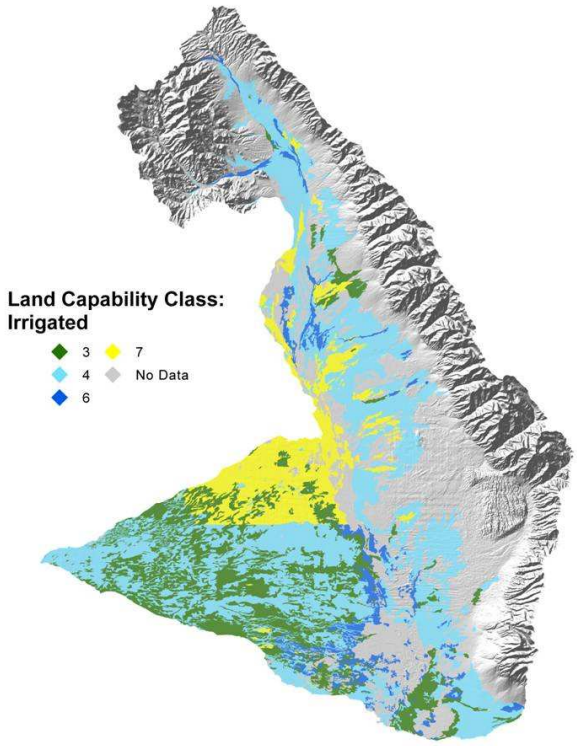


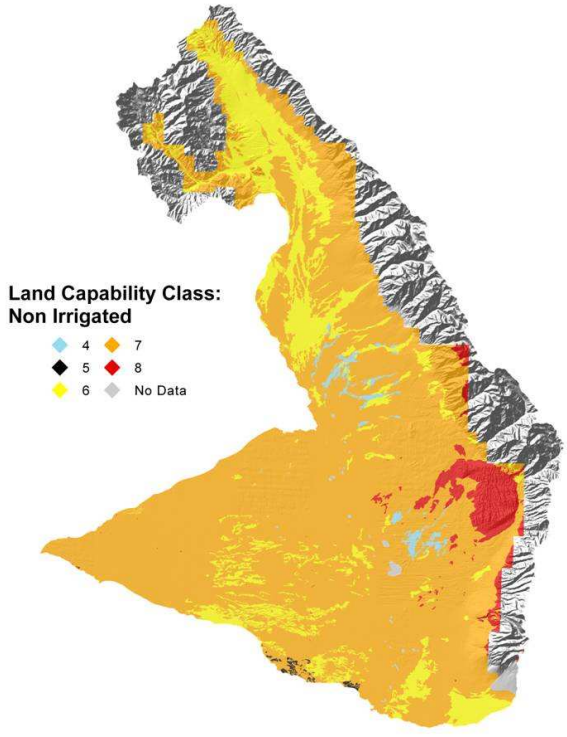
Ecological Sites

The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at http://www.nrcs.usda.gov/technical/efotg/.







Land Capability Classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive land-forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use.

Class 1 - soils have few limitations that restrict their use.

Class 2 - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

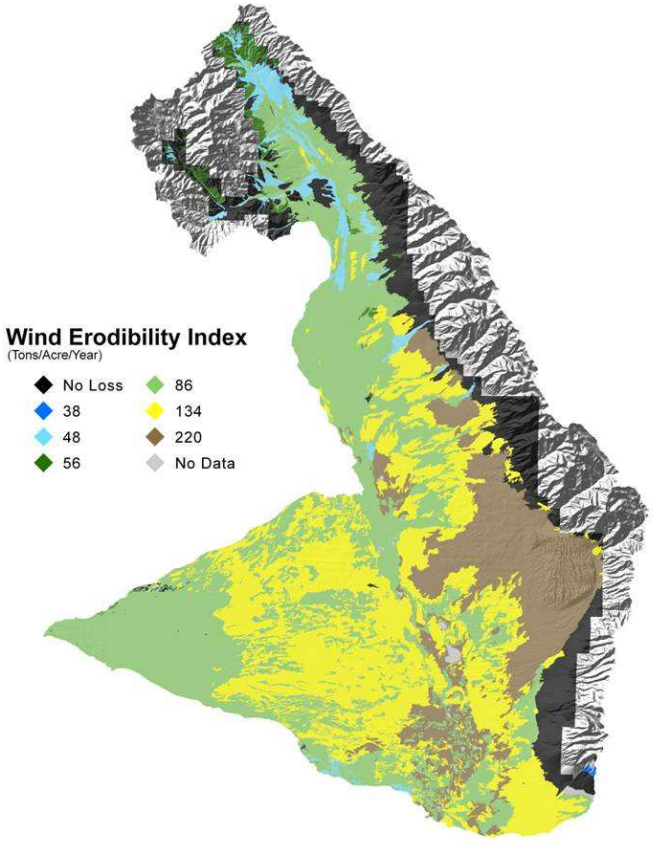
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

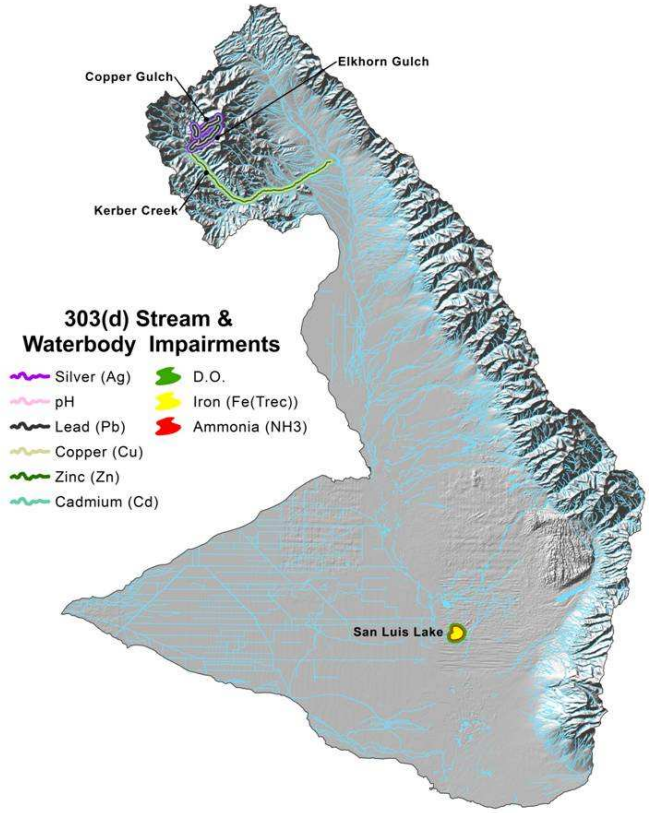


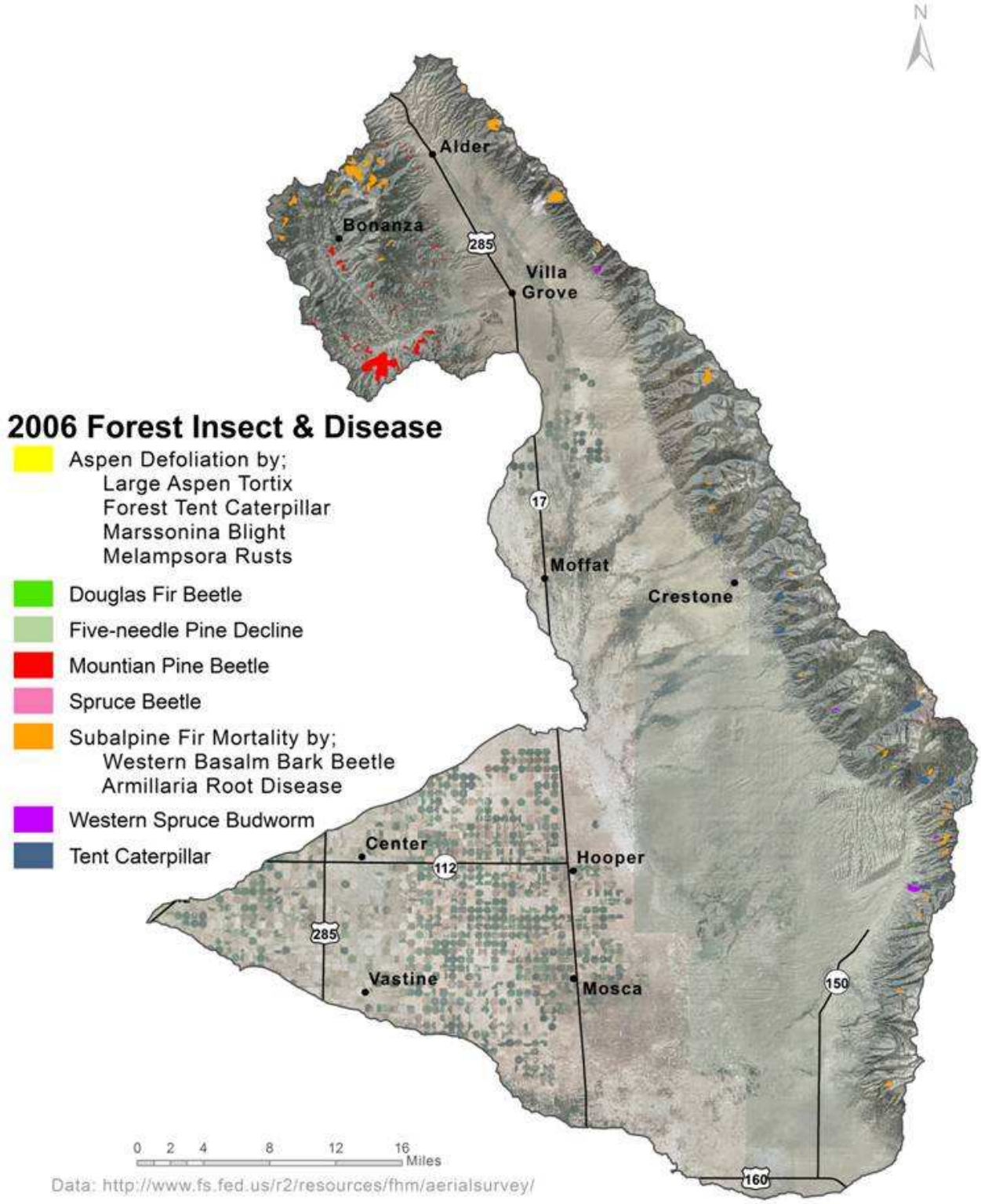
The Wind Erodibility Index (WEI), is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

As shown on the Wind Erodibility Index map below, most soils in the San Luis Watershed are considered highly erodible.

This map shows stream locations within the watershed that are listed on the 303d list. Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs compromising quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards.




N
Alder
Bonanza
285
Villa
Grove
17
Moffat
Crestone
Center
112
Hooper
285
Vastine
Mosca
150
160
2006 Forest Insect & Disease
Aspen Defoliation by;
Large Aspen Tortix
Forest Tent Caterpillar
Marssonina Blight
Melampsora Rusts
Douglas Fir Beetle
Five-needle Pine Decline
Mountian Pine Beetle
Spruce Beetle
Subalpine Fir Mortality by;
Western Basalm Bark Beetle
Armillaria Root Disease
Western Spruce Budworm
Tent Caterpillar
0 2 4 8 12 16
Miles
Data: http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/

State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in San Luis Watershed

Common Name	Scientific Name	Class	State Status/Federal Status	Comments
American Peregrine Falcon	*Falco peregrinus anatum*	Birds	Concern/None	Occurs in the watershed
Bald Eagle	*Haliaeetus leucocephalus*	Birds	Threatened/None	Winters in the watershed
Black-footed Ferret	*Mustela nigripes*	Mammals	Endangered/Endangered	Suitable habitat in watershed; Extirpated
Burrowing Owl	*Athene cunicularia*	Birds	Threatened/None	Occurs in the watershed
Canada Lynx	*Lynx canadensis*	Mammals	Endangered/Threatened	May occur in the watershed
Ferruginous Hawk	*Buteo regalis*	Birds	Concern/None	Occurs in the watershed
Greater Sandhill Crane	*Grus canadensis tabida*	Birds	Concern/None	Occurs in the watershed
Gunnison's Prairie Dog	*Cynomys gunnisoni*	Mammals	None/Candidate	Occurs in the watershed
Gunnison Sage-grouse	*Centrocercus minimus*	Birds	Concern/None	Occurs in the watershed
Mountain Plover	*Charadrius montanus*	Birds	Concern/None	Occurs in the watershed
Northern leopard frog	*Rana pipiens*	Amphibians	Concern/None	Occurs in the watershed
Rio Grande Chub	*Gila pandora*	Fish	Concern/None	Occurs in the watershed
Rio Grande Cutthroat Trout	*Oncorhynchus clarki virginalis*	Fish	Concern/None	Occurs in the watershed
Rio Grande Sucker	*Catostomus plebeius*	Fish	Endangered/None	Occurs in the watershed
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Birds	Endangered/Endangered	Occurs in the watershed
Townsend's big-eared bat (pale ssp)	*Corynorhinus townsendii pallescens*	Mammals	Concern/None	Occurs in the watershed
Western Snowy Plover	*Charadrius alexandrinus*	Birds	Concern/None	May occur in the watershed - Alamosa County, rare/occasional
Western Yellow-billed Cuckoo	*Coccyzus americanus*	Birds	Concern/Candidate	May occur in the watershed – not expected
Wolverine	*Gulo gulo*	Mammals	Endangered/None	Suitable habitat in watershed; No current records of occurrence

The terrestrial habitats in this watershed include desert shrub and grassland, foothills and montane shrub and forest, and alpine tundra. Riparian areas and wetlands provide important aquatic habitats for a number of species providing food, cover, or water at some life stage.

Wildlife found at the highest elevations in the San Luis watershed include pika, marmot, lynx, bighorn sheep, and white-tailed ptarmigan. The coniferous forest in the northern part of the watershed has a few wild turkey.

Economically important species in the watershed include: black bear, elk, mule deer, mountain lion, and trout, throughout most of the watershed and pronghorn (antelope) in lower elevation shrub and grasslands. A small population of Gunnison sage grouse occurs near the upper end of the watershed. Irrigated cropland areas of the watershed provide winter habitat for snow geese and important stop over areas for migrating sandhill cranes. Even though they are a non-game species, sandhill cranes are economically important because of the tourism dollars they attract to the San Luis Valley.

Social Data		Costilla	Rio Grande	Saguache
Demographics (US Census, American Factfinder)				
Total population	14,966	3,663	12,413	5,917
Male	7446	1,830	6,116	2,984
Female	2520	1,833	6,297	2,933
Median age (years)	30.6	42.1	37.3	36.9
White	10,654	2,231	9,177	4,218
Black or African American	145	29	43	7
American Indian and Alaska Native	350	91	157	122
Asian	122	37	28	27
Native Hawaiian and Other Pacific Islander	28	5	3	0
Some other race	623	1079	2662	1361
Hispanic or Latino (of any race)	6197	2476	5172	2678
Economic Characteristics (US Census, American Factfinder)				
In labor force (population 16 years and over)	7507	1,312	5,732	2,666
Median household income (dollars)	29,447	19,531	31,836	25,495
Median family income (dollars)	38,389	25,509	36,809	29,405
Per capita income (dollars)	15,037	10,748	15,650	13,121
Families below poverty level	580	219	385	291
Individuals below poverty level	2992	978	1769	1325
X means that value is not applicale or not available				
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)				
Farms (number)	318	205	344	252
Land in farms/ranches (acres)	204,640	354,067	170,999	477,003
Average size farm/ranch (acres)	644	1,727	497	1,893
Median size farm (acres)	320	170	280	640
Average age of farmer or rancher	51.7	53.7	54.2	54.1
Net cash return from ag sales ($1,000)	33426	10,117	25,647	24,040
Cattle and calves (number)	9,500	6,500	12,000	20,000

San Luis Watershed Natural Resource Concerns

Map Legend—Conservation Districts

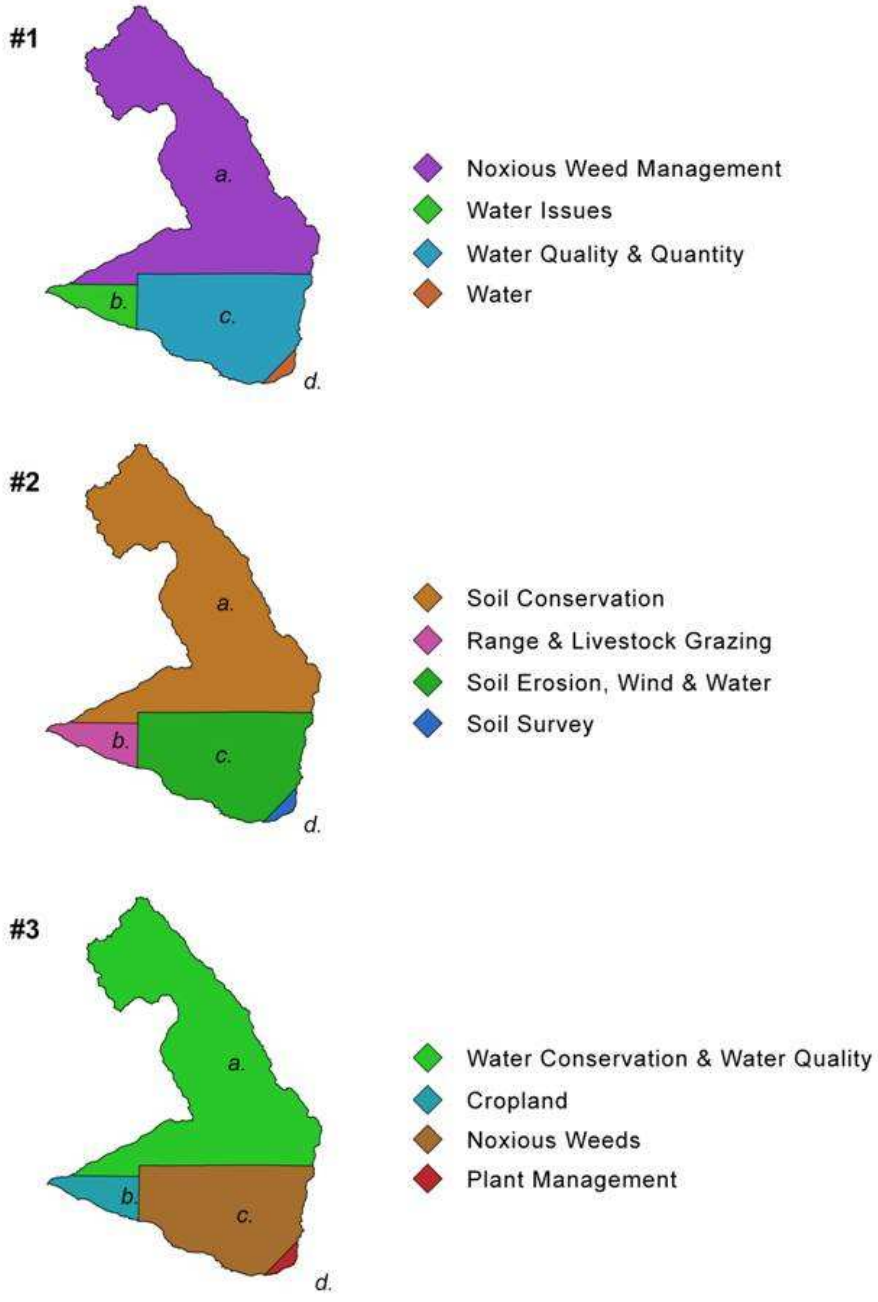
a. Center

b. Rio Grande County

c. Mosca-Hooper

d. Costilla County

Note: The Colorado Conservation Districts identified and prioritized these resource concerns during facilitated public meetings and are included in their Long Range Plans.



Selected Conservation Application Data

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	10,184	31,946	na	40,962	14,032	19,264	116,388
Total Conservation Systems Applied (Acres)	14,097	28,807	na	36,559	11,948	16,091	107,502
Practices							
Prescribed Grazing	19,147	0	4,160	12,169	485	692	36,653
Upland Wildlife Habitat Management	96	640	195	375	999	688	2,993
Conservation Cropping Rotation	na	na	331	1,767	4,548	877	7,523
Irrigation Water Management	2,805	7,020	19,177	6,083	3,309	3,084	41,478

Conservation Systems to Address Major Resource Concerns

Primary Resource Concern:	**Rangeland Health**			
Conservation System Description:	Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. Estimate 55,000 acres need to be treated on median sized ranches of 1,200 acres.			**Based on Conservation System Guide Code:** CO 51.1-GR-01-R-Grazing
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost per Median Sized Ranch ($)**
Prescribed Grazing				
Fence (382)	Ft.	8,000	0.6	4,800
Pest Management (595)	Ac.	600	15	9,000
Pipeline (516)	Ft.	12,000	1.05	12,600
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	2	500	1,000
Windbreak/Shelterbelt Establishment (380)	Ft.	2,000	.35	700
Subtotal: Costs to apply prescribed grazing based on median sized ranch of 1,200 acres	**No.**	**46**	**28,100**	**Est. Total Rangeland Costs: $1,292,600**

Conservation Systems to Address Major Resource Concerns (cont'd)

Primary Resource Concern:	Water Quality			
Conservation System Description:	Upgrading Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Mgt.			**Reference Conservation System Guide Code:** CO 51.1-CR-Sprinkler-R-2
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Irrigation Water Management (449)* * includes re-bowl, renozzle, and IWM	Ac	65,000	10.20	663,000
Nutrient Management (590)	Ac	70,000	5	350,000
Pest Management (595)	Ac	70,000	15	1,050,000
Conservation System Description:	Surface irrigation converted to sprinkler system. Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Mgt.			**Reference Conservation System Guide Code:** CO 51.1-CR-Gravity-R-2
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Irrigation System, Sprinkler (442)	Ac	12,000	600	7,200,000
Irrigation Water Management (449)	Ac	7,000	5	35,000
Nutrient Management (590)	Ac	24,000	5	120,000
Land Leveling (464)	Ac	10,000	300	3,000,000
Pest Management (595)	Ac	24,000	15	360,000
Conservation Crop Rotation	Ac	105,600	5	528,000
			Subtotal Irrigated Crops:	**$13,306000**

General Effects, Impacts, and Estimated Costs of Application of Conservation Systems

Landuse	Resource Concern	Measurable Effects	Non-measurable Effects	Estimated Cost ($)
Rangeland	Plants		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter.	**1,292,600**
Irrigated Crop	Water		Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely affected.	**13,306,000**
			Estimated Total Costs to Address Major Resource Concerns:	**$14,598,600**

References Not Cited in Document

303(d) listed streams within Big Sandy Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf.

Threatened and Endangered Species information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS).

Resource Concerns were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. For more information on Colorado's Conservation Districts, visit http://www.cacd.us.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado surveys:

Alamosa Area (CO632) Published 01/08/2007 Costilla County Area (CO023) Published 01/20/2006

Saguache County Area (CO633) Published 01/08/2007 Rio Grande County Area (CO631) Published 01/16/2007

Vegetation data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. visit http://ndis.nrel.colostate.edu/coveg.

Common Resource Area (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. For more information on Common Resource Areas visit http://soils.usda.gov/survey/geography/cra.html.

Average Annual Precipitation data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information visit http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html or http://www.ocs.orst.edu/prism.

Land Ownership (status, 2004 dataset) data was obtained from the Colorado Department of Transportation (CDOT). For more information, visit http://www.dot.state.co.us.

Relief & Elevation maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). The data was downloaded from the NRCS Geospatial Data Gateway at http://datagateway.nrcs.usda.gov.

Conservation Systems to address major resource concerns were extracted from the Conservation Systems Guides (CSG) compiled from local conservationists by the NRCS Ecological Sciences Section at the Lakewood State Office.

Effects and Impacts of application of conservation systems were extracted from Colorado eFOTG, Section III, Resource Quality Criteria, NRCS, Colorado, March 2005.